A.D. 1820 . . . . . N° 4455.

SPECIFICATION

OF

JOSIAH PARKES.

FURNACES FOR STEAM ENGINES AND OTHER BOILERS.

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Furnaces for Steam Engines and other Boilers.

PARKES' SPECIFICATION.

TO ALL TO WHOM THESE PRESENTS SHALL COME, I, JOSIAH PARKES, of the Borough of Warwick, Worsted Manufacturer, send greeting.

WHEREAS His most Excellent Majesty King George the Fourth, by His Letters Patent under the Great Seal of Great Britain, bearing date at Westminster, the Ninth day of May, in the first year of His reign, did, for Himself, His heirs and successors, give and grant unto me, the said Josiah Parkes, His especial licence that I, the said Josiah Parkes, my executors, administrators, and assigns, or such others as I, the said Josiah Parkes, my executors, administrators, or assigns, should at any time agree with, and no others, from time to time and at all times during the term of years therein expressed, should and lawfully might make, use, exercise, and vend within England, Wales, and the Town of Berwick-upon-Tweed, and also within all His Majesty's Colonies and Plantations abroad, my Invention of "**A NEW AND IMPROVED METHOD OF LESSENING THE CONSUMPTION OF FUEL IN STEAM ENGINES AND FURNACES IN GENERAL, AND FOR CONSUMING SMOKE**;" in which said Letters Patent is contained a proviso obliging me, the said Josiah Parkes, by an instrument in writing under my hand and seal, particularly to describe and ascertain the nature of my said Invention, and in what manner the same is to be performed, and to cause the same to be enrolled in His Majesty's High Court of Chancery within six calendar months next and immediately after the date of the said recited Letters Patent, as in and by the same, reference being thereunto had, will more fully and at large appear.

NOW KNOW YE, that in compliance with the said proviso, I, the said Josiah Parkes, have executed this instrument, by which I do declare that the nature of my said Invention, and the manner in which the same is to be used and put in practice, are particularly described and ascertained in manner following, viz^{t}:—

My Invention of a new and improved method of lessening the comsumption of fuel in steam engines and furnaces in general, and for consuming smoke, consists in the new application, disposition, and arrangement of certain parts and principles already known and in use in furnaces of various descriptions, and in the variation of the structure of the said furnaces, by which new arrangement, application, and disposition, and by which variation, I constitute a furnace that possesses considerable advantages over those furnaces which are at present employed for steam engine boilers, brewery coppers, and most other description of furnaces; and the principle of my said Invention does consist in such new application, disposition, and arrangement of parts and such variation of structure. I will first endeavour to state in as concise a manner as possible the advantages which would occur from the introduction of my Invention. The parts of my improved furnace are so disposed and constructed as to render it capable of consuming the greater portion of the smoke or inflammable gas which rises from the combustibles used in the furnace, instead of permitting the said smoke or gas to escape through the chimney or vent into the atmosphere, to the great annoyance of the surrounding neighbourhood, and waste of useful combustible matter; for it is evident that if the smoke or inflammable gas which is suffered to escape from the chimneys of most furnaces was caused to ignite or inflame in its passage through the flues or openings under the boiler, or in the body of the furnace, a considerable degree of heat would be generated by such inflammation or ignition, whereby also a saving in the consumption of fuel or combustible matter would be effected in every description of furnace constructed according to my improved method. Now the principle of my Invention does consist in exposing the whole or nearly the whole column of smoke generated by the combustion of the fuel to a stream of atmospheric air so near the fire that the said column of smoke may meet the said air in a state of very great heat and thus be ignited, and so moderate in bulk that the said column of smoke may be wholly or almost wholly consumed by ignition. In order to render the explanation of this the principle of my Invention clear and intelligible, I have hereunto annexed a Sheet of Drawings or Plans which are intended to represent the form and construction of a furnace adapted to a steam engine or other boiler upon my new principle and according to my improved method. Figure 1 on the Sheet

of Drawings represents a side elevation of the exterior of the boiler and brick work; Figure 2, a longitudinal section taken through the middle, in order to explain the internal structure of the furnace; Figure 3, a transverse section through the fire-place; and Figure 4, an horizontal section beneath the bottom of the boiler; it will be observed that the same characters or letters of reference denote the same parts in all the Figures upon the Sheet of Drawings. A shews the body of the furnace or part which is adapted to receive and contain the combustible matters used in making the fire; it is constructed of brick work, after the usual manner of such furnaces, and supplied with a current air through the grating bars *b*, *b*, from the ash pit B, which is entirely open on one side to allow the air to enter freely, as also to remove the ashes or cinders which fall down through the grating from the fire. The coals or other combustibles intended to be employed in the furnace are to be introduced through the opening C, called the mouth piece, which is furnished with doors *d*, *d*, on the outside; these may be occasionally opened for the purposes of adding fresh fuel or for stirring the fire, but should be kept carefully closed during the regular course of working the furnace. The mouth piece C is composed of cast iron plates or other fit materials in the form of a box or trough, extending in length from the external wall of the furnace to the commencement of the grating bars, and in width corresponding with the space between the walls which form the sides of the ash pit, as will appear evident from inspection of the Figure 4, where C represents the mouth piece, with the upper plate supposed to be removed to shew the central partition *e*, against which the doors *d*, *d*, shut; the upper plate of the mouth piece is not firmly fixed on, but has the liberty of contracting or expanding so as not to be broken by the action of the fire. The mouth piece is placed somewhat inclining downwards to the fire, and is supported upon iron bars *a*, *a*, Figure 3, which extend across the ash pit. The brick work which passes over the mouth piece to form the flues round the boiler is supported upon iron bearers *c*, *c*, so as to leave a small vacancy above the top plate, in order that the mouth piece may be taken out to gain access to the boiler, if requisite, without deranging the brick work; the space left above the mouth piece is closed to prevent the entrance of air by a small sliding plate T, T, Figure 1 and 3, shutting down upon its upper surface, and fixed by screws or otherwise. The boiler D is enclosed in brick work N, N, in such manner as to form a flue or passage E, E, round it, as seen in the plan, Figure 4. F shews a broad flat flue extending under the boiler bottom for the flame and smoke to pass from the body of the furnace into the flue E, E, through an aperture G at the furthermost part of the boiler, where it rises, and after circulating round the

flue E, E, escapes in the chimney or vent H, as shewn by the direction of the small darts or arrows in the horizontal section, Figure 4. The chimney has a turning plate or damper fixed in it at I, which serves to regulate the draught or current of air through the fire and flues as occasion may require; the damper I may be opened or shut by moving the small lever *i*, which is fixed firmly upon its axis on the outside the chimney and retained in any position by the catch *k*. K shews the steam pipe for conveying steam from the boiler to any desired situation to work an engine or for any other purpose. L represents the safety valve, which is adapted to allow the steam to escape freely whenever it becomes so strong in the boiler as to endanger its bursting. N shews the man-hole or opening on the top of the boiler, for the purpose of entering the same to repair or clean it out. I have now described the principle parts of a boiler and furnace, such as are already in use for steam engines, and it remains for me to explain how my improvement is effected for rendering such furnace capable of consuming the smoke or inflammable gas which rises from the combustible matters employed in maintaining the fire, which smoke or inflammable gas has heretofore been allowed to escape through the chimneys of furnaces without producing any beneficial effect, and to the discomfort and annoyance of the vicinage. I cause a long narrow opening to be made in that part of the furnace commonly called the bridge or throat, or, in other words, at that part where all the smoke and flame are obliged to pass through immediately on their quitting the fire upon their passage through the flues to the chimney or vent, and that bridge or throat at the said place where the said opening enters into it I cause to be contracted, so that the column of smoke to be exposed to the action of the column of air entering through the opening shall be sufficiently small to be consumed. The opening in the bridge is seen at O, Figure 4, and is represented equal in length to the whole width of the passage through which the flame and smoke must pass. The opening O communicates directly with the lower part of the ash pit B (or with any other place where the air is pure and unburnt) by a passage P, P, Figure 2, seen also by dotted lines *v*, *v*, in Figure 3. Now by this arrangement, without impeding the draft of the fire, a rapid current of atmospheric air will enter the furnace at O, so as to meet the flame and smoke in its passage over the bridge, and immediately on its quitting the fire, and by combining with the heated smoke, render it capable of entering into a state of actual combustion in the flue F under the boiler, as before mentioned. A very small quantity of smoke is perceived to issue from the chimney of a furnace constructed in this manner, consequently a saving of fuel is effected by the inflammable matters contained in the smoke being reduced to a state of actual flame. The lower

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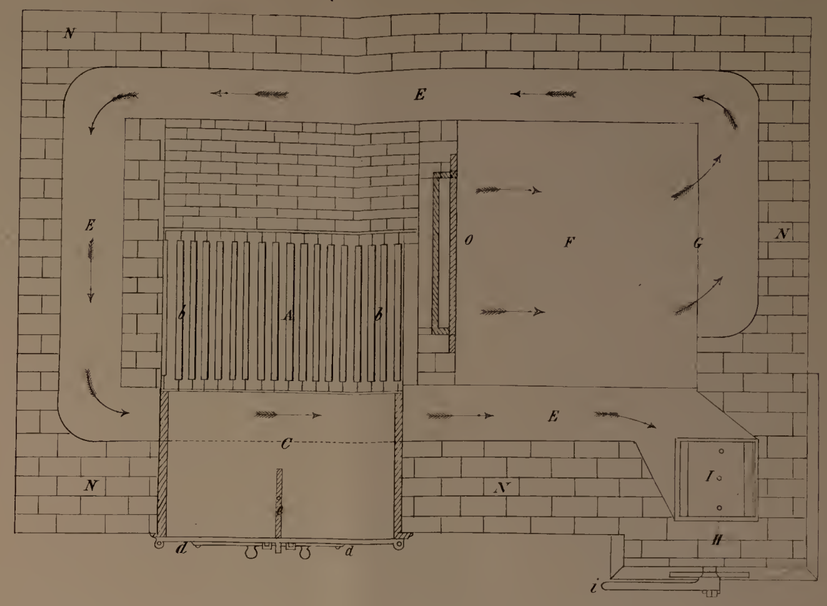
FIG. 4. (1 SHEET)



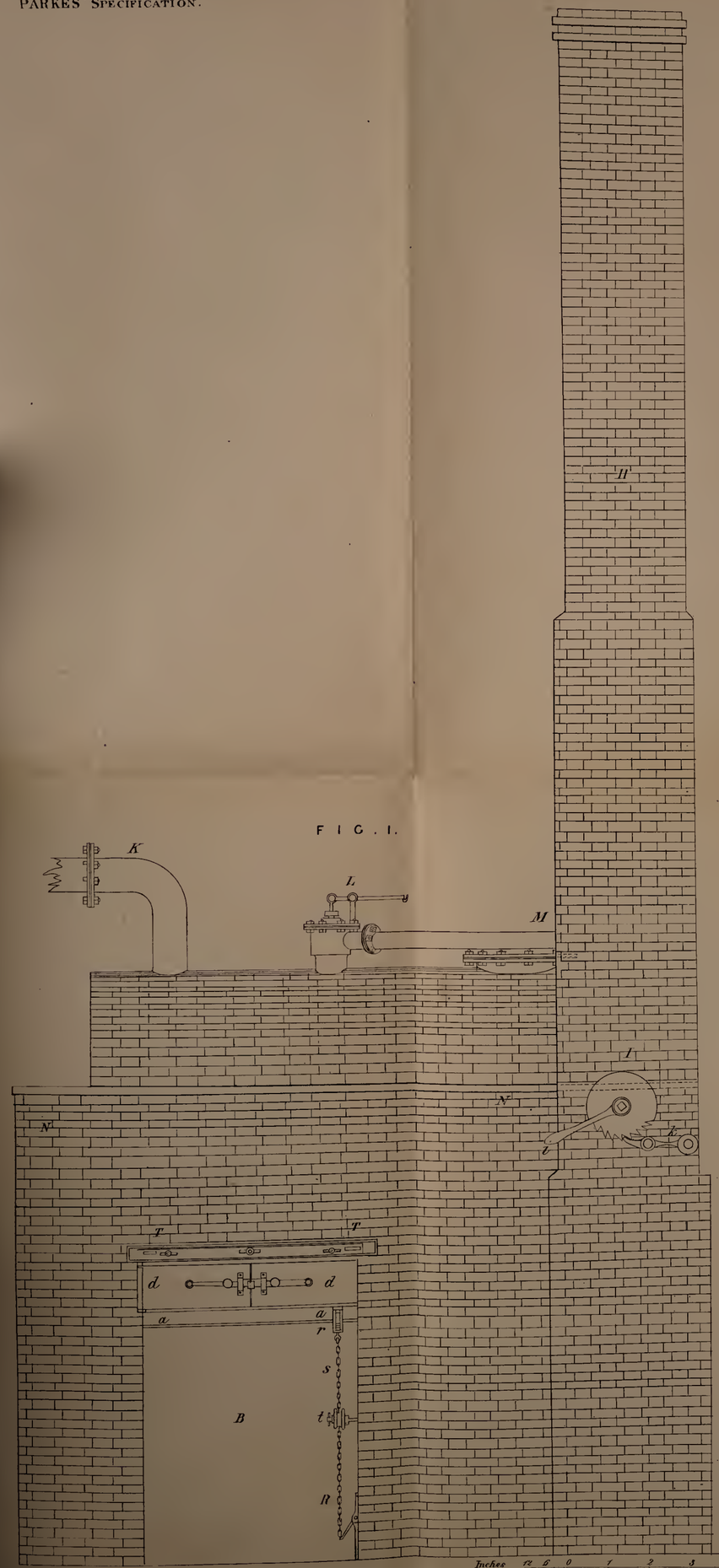


FIG. 1.

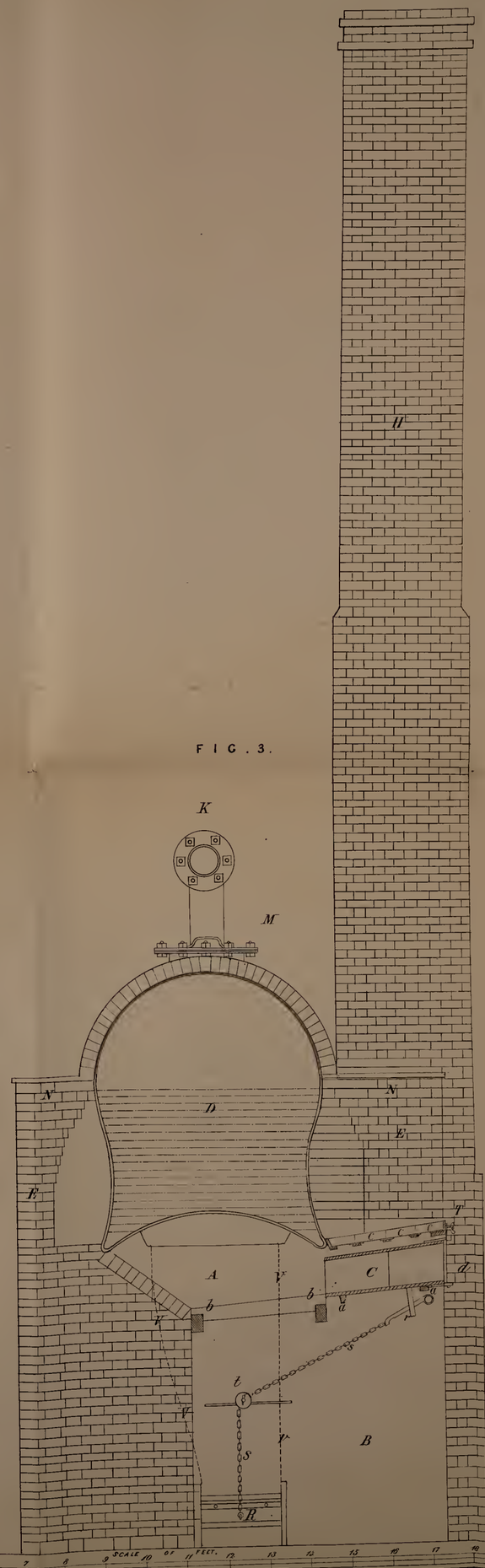


FIG. 3.

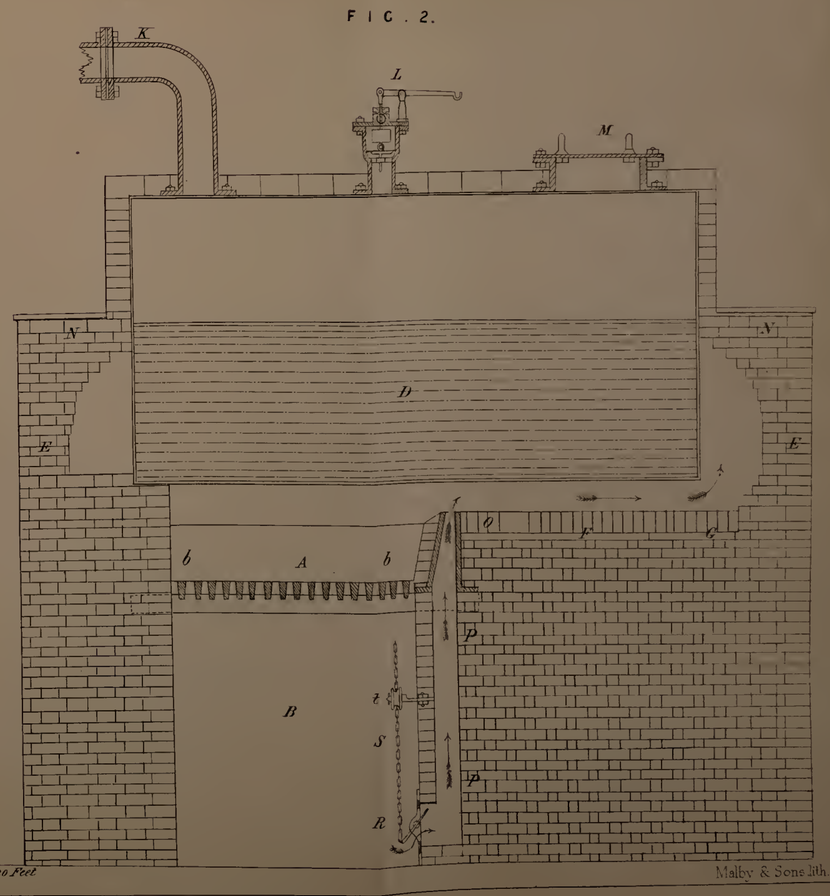


FIG. 2.

Inches 12 6 0 1 2 3 4 5 6 7 8 9 SCALE 10 OF 11 FEET. 12 13 14 15 16 17 18 19 20 Feet

Malby & Sons lith.

The enrolled drawing is colored.

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part of the air passage P, P, which communicates with the ash pit is furnished with a door or valve R to regulate the quantity of atmospheric air which may be required to rise up through the opening O at the bridge of the furnace in order to destroy the smoke; this door may be opened or shut at pleasure by the person who attends the fire simply by moving the small rack *r* backwards or forwards, which is connected with the door R by means of a small chain *s*, going over a pulley *t*, as will appear evident from inspection of the Figures. In some particular instances it may be found beneficial to admit a thin current of air at more than one part of the furnace, in which case I should recommend the flue or passage through which the smoke must pass to be contracted or diminished in size at the part where the second air opening is intended to be made, in order to concentrate the heat contained in the smoke as much as possible and cause a more rapid current; when more than one air opening is employed, each one should be furnished with an independent regulating door and other apparatus, as above described. The opening O in Figures 2 and 4 is surrounded by iron plates to protect the edges of the bricks from being broken, and also to support and strengthen the bricks forming the face of the bridge. These explanations are intended in order to illustrate my said principle by examples, and to enable persons duly skilled in such matters to apply and use it; various other modes may be devised in which the same purpose may be effected upon the same principle, only I consider the above as a very convenient one. But my Invention does consist in the principle above stated.

In witness whereof, I, the said Josiah Parkes, have hereunto set my hand and seal, the Seventeenth day of May, in the year of our Lord One thousand eight hundred and twenty.

JOSIAH PARKES. (L.S.)

Signed, sealed, and delivered by the above-named Josiah Parkes (being first duly stamped) in the presence of

S. W. HAYNES,
Clerk to Messrs Heydon & Parkes,
Solicitors,
Warwick.

Parkes' Improved Consumption of Fuel in Steam Engines and Furnaces, &c.

ALEXANDER PARKES, a Master Extra. in Chancery.

AND BE IT REMEMBERED, that on the Seventeenth day of September, in the year above mentioned, the aforesaid Josiah Parkes came before our Lord the King in this Chancery, and acknowledged the Specification aforesaid, and all and everything therein contained, in form above written. And also the Specification aforesaid was stamped according to the tenor of the Statute in that case made and provided.

Inrolled the First day of November, in the year above written.

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